

Attachment III

Causal Analysis Report

Chevron Richmond Refinery
Reportable Flaring Events

February 22, 2020
Flaring Due to Emergency Scrubber Operation

Refinery Flare Event – Cause Investigation Report

1. Date on which the report was drafted: April 29, 2020

2. The refinery name and site number:

Refinery: Chevron Richmond Refinery

Refinery Site Number: A0010

3. The assigned refinery contact name and phone number:

Contact Name: Katie Gong

Contact Phone Number: (510) 242-1930

Is this a rescission/modification of a previous report: No.

Date of initial report: N/A

Reason for rescission/modification: N/A

4. Identification of flare (s) at which the reportable event occurred by reviewing water seal monitoring data to determine which seals were breached during the event

Flare	Reportable Event (SO ₂ or Vent Gas Volume)
LSFO (S-6010)	SO ₂

5. The flaring event duration for each affected flare

Flare (Source Number): LSFO (S-6010)

The Date(s) of the event: February 22, 2020

The start time of the event: 12:53PM

The end time of the event: 4:40PM

The net duration of event (in hours and minutes): 3 hours and 48 minutes

6. A brief description of the flaring event –

On February 22, 2020, while troubleshooting a plant upset, acid gas was routed to an emergency scrubber in the #5 Hydrogen Sulfide (#5 H₂S) unit of the Distillation and Refining Business Unit. The ammonia flow ratio into the emergency scrubber bottoms recirculation system was insufficient for absorption, and the emergency scrubber overhead vapor flow went to the relief system. Flaring began at approximately 12:53 PM at the Low Sulfur Fuel Oil (LSFO) flare. The primary source of vent gas flared during this event was process material from the #5 H₂S unit. Operations immediately began to troubleshoot to reduce acid gas flow to relief, and as a result, flaring ceased at approximately 4:40 PM. The sulfur dioxide (SO₂) emissions from the LSFO flare exceeded 500 pounds (lbs) on February 22, 2020.

7. A process flow diagram showing the equipment and process units that were the primary cause of the event.

See Attachment IIIa

8. The total volume of vent gas flared (MMSCF) throughout the event

Flare	Volume (MMSCF)
LSFO	0.13

9. The emissions associated with the flaring event per calendar day

Flare	Calendar Day	CH4 (lbs.)	NMHC (lbs.)	SO2 (lbs.)
LSFO	February 22, 2020	1.5	2.2	14530.5

Assumptions used to calculate emissions – consistent with the reporting under Reg. 12-11.

10. A statement as to whether or not the gas was scrubbed to eliminate or reduce any entrained compounds and a list of the compounds for which the scrubbing was performed.

Some of the relief gases were scrubbed by the emergency scrubber to reduce entrained H₂S.

11. The primary cause of the flaring event including a detailed description of the cause and all contributing factors. Also identify the upstream process units that contributed vent Gas flow to the flare header and provide other flow instrumentation data where available.

Root cause: Throughout the event, the ammonia to the emergency scrubber feed ratio was not consistent with the job aid table.

Contribution factor: The emergency scrubber vapor flow is the primary indicator of H₂S carryover. The emergency scrubber flowmeter is not reliable, and there are no alarms on the emergency scrubber overhead flow.

The main contributor of vent gas flow during this event originated from the #5 H₂S unit.

12. Describe all immediate corrective actions to stabilize the flaring event, and to reduce or eliminate emissions (flare gas recovered or stored to minimize flaring during the event). If a decision was made not to store or recover flare gas, explain why.

Operations immediately began to troubleshoot to reduce acid gas flow to relief.

13. Was the flaring the results of an emergency? If so, was the flaring necessary to prevent an accident, hazard or release to the atmosphere?

The flaring was not due to an Emergency (defined in Regulation 12-12-201) as interpreted by the BAAQMD.

14. If not the result of an emergency and necessary to prevent an accident, hazard or release to the atmosphere, was the flaring consistent with an approved FMP? If yes, provide a citation to the facility's FMP and any explanation necessary to understand the basis for this determination.

The flaring was consistent with Chevron's FMP Section 5.1 Figure 5-1. This event was unplanned. Causes for the flaring were analyzed through a TapRoot® investigation and the corrective actions have already been or will be implemented to reduce the likelihood of a recurrence of flaring resulting from the same causes.

15. If the flaring was due to a regulatory mandate to vent to flare, why couldn't the gas be recovered, treated, and used as fuel gas?

N/A. Flaring was not due to regulatory mandate.

16. Identify and describe in detail each prevention measure (PM) considered to minimize flaring from the type of reportable flaring event that occurred.

a) State whether the PM is feasible (and will be implemented), or not feasible

b) Explain why the PM is not feasible, if applicable

All prevention measures have been considered and have or will be implemented.

1. Repair the emergency scrubber overhead vapor flow meter.
Projected completion date: 7/31/2020
2. Add an alarm for the emergency scrubber overhead vapor flow.
Projected completion date: 2/28/2021
3. Convert job aid to startup emergency scrubber into a procedure.
Projected completion date: 10/31/2020
4. Deliver emergency scrubber refresher training to board operators.
Projected completion date: 12/31/2020

Flaring Due to Emergency Scrubber Operation

On February 22, 2020, while troubleshooting a plant upset, acid gas was routed to an emergency scrubber in the #5 Hydrogen Sulfide (#5 H₂S) unit of the Distillation and Refining Business Unit. The ammonia flow ratio into the emergency scrubber bottoms recirculation system was insufficient for absorption, and the emergency scrubber overhead vapor flow went to the relief system. Flaring began at approximately 12:53 PM at the Low Sulfur Fuel Oil (LSFO) flare. The primary source of vent gas flared during this event was process material from the #5 H₂S unit. Operations immediately began to troubleshoot to reduce acid gas flow to relief, and as a result, flaring ceased at approximately 4:40 PM. The sulfur dioxide (SO₂) emissions from the LSFO flare exceeded 500 pounds (lbs) on February 22, 2020.

